PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 22 NOV 2005
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Applicant's or agent's file reference 13015/39003APCT	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/US2004/022382	International filing date *(day/month/year)* 12.07.2004	Priority date *(day/month/year)* 28.07.2003
International Patent Classification (IPC) or national classification and IPC B05D3/02, B65D1/12		
Applicant VALSPAR SOURCING, INC. et al.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 10 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the opinion
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
28.04.2005	21.11.2005
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Andriollo, G Telephone No. +49 89 2399-8301

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/US2004/022382

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3 and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4)
   - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages	
1-44	as originally filed
Claims, Numbers	
1-30	filed with telefax on 28.04.2005
Drawings, Sheets	
1/1	as originally filed

   ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/US2004/022382

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-28,30
	No:	Claims	29
Inventive step (IS)	Yes:	Claims	1-28,30
	No:	Claims	29
Industrial applicability (IA)	Yes:	Claims	1-30
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Item V

1. The following documents are cited in the search report; the numbering will be adhered to in the rest of the procedure :
   D1 : WO-A-02092241
   D2 : EP-A-0312311.

2. The present application does not satisfy the criterion set forth in Article 33(2) PCT because the subject-matter of claim 29 lacks novelty in respect of prior art.

2.1 D1 discloses a repair agent for damaged can ends. The repair agent is sprayed on the metal can end and subsequently cured by radiations (see p. 4, paragraphs 11 and 12). The radiation is an electron beam or UV rays (see p. 10, paragraph 29). Among the containers disclosed in D1, some may have a scored line in the can end (see p. 1, last paragraph). Therefore, the scored line also is coated with a radiation curable composition.
Consequently, the subject-matter of present claim 29 lacks novelty over D1.

2.2 D2 describes can ends provided with a score line. The can ends are coated with a polymeric protective coating, which implies that the score line also is coated by said polymeric coating.
Consequently, the subject-matter of present claim 29 lacks novelty over D2.

1. A method of imparting corrosion resistance to a score line of an easily openable metal can end comprising the steps of:

(a) providing a metal can end having a score line;

(b) applying a layer of a radiation-curable coating composition to the score line to provide a coated metal can end, said radiation-curable coating composition comprising:

(i) a difunctional compound,

(ii) a polyfunctional reactive diluent,

(iii) a cationic photoinitiator, and

(iv) up to about 12%, by weight, of a monofunctional reactive diluent; and

(c) exposing the coated metal can end to a sufficient dose of radiation to cure the radiation-curable coating composition and form a cured coating composition on the score line.

2. The method of claim 1 further comprising the step of:

(d) heating the coated metal can end resulting from step (c) for about one to about five minutes at about 65°C to about 205°C for about one to about five minutes.

3. The method of claim 1 wherein the metal can end is manufactured from a metal selected from the group consisting of aluminum, tin-free steel, tinplate, steel, zinc-plated steel, zinc alloy-plated steel, lead-plated steel, lead alloy-plated steel, aluminum-plated steel, aluminum alloy-plated steel, and stainless steel.

4. The method of claim 1 wherein the radiation-curable coating composition further comprises up to about 30% of a solvent selected from the group consisting of water, an organic solvent, or a mixture thereof.

5. The method of claim 1 wherein the radiation-curable coating composition comprises about 60% to about 85%, by weight, of the difunctional compound.

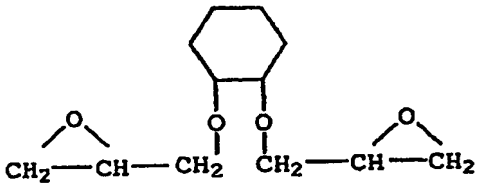
6. The method of claim 1 wherein the radiation-curable coating composition comprises about 10% to about 20%, by weight, of the polyfunctional reactive diluent.

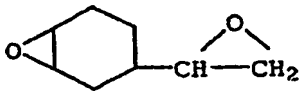
7. The method of claim 1 wherein the radiation-curable coating composition comprises about 2% to about 8%, by weight, of the photoinitiator.

8. The method of claim 1 wherein the difunctional compound is selected from the group consisting of a diepoxy compound, a vinyl epoxy compound, a divinyl compound, or a mixture thereof.

9. The method of claim 8 wherein the diepoxy compound comprises a cycloaliphatic diepoxy compound.

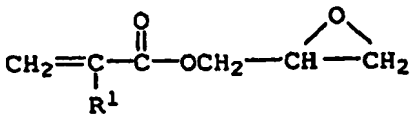
10. The method of claim 9 wherein the cycloaliphatic diepoxy compound is selected from the group consisting of 3,4-epoxycyclohexylmethyl-3,4-epoxycyclohexane carboxylate, bis(3,4-epoxycyclohexyl)methyl adipate, 2-(3,4-epoxycyclohexyl-5.5-spiro-3,4-epoxy)cyclohexane-metal-dioxane, 1,6-hexanediol diglycidyl ether, dipropylene glycol diglycidyl ether, diglycidyl ether of polypropylene glycol, ethylene glycol diglycidyl ether, a diglycidyl ether of phthalic acid, a diglycidyl ether of hexahydrophthalic acid, propylene glycol dioleate epoxide, limonene dioxide, a cresol-novolac diepoxy compound,





and mixtures thereof.

11. The method of claim 8 wherein the vinyl epoxy compound has a structure



wherein R^1 is hydrogen or methyl.

12. The method of claim 8 wherein the vinyl epoxy compound is selected from the group consisting of glycidyl methacrylate, glycidyl acrylate, mono- and diglycidyl itaconate, mono- and diglycidyl maleate, mono- and diglycidyl fumarate, that allyl glycidyl ether, vinyl glycidyl ether, and mixtures thereof.

13. The method of claim 8 wherein the divinyl compound is selected from the group consisting of divinyl ether, diethylene glycol divinyl ether, 1,4-butanediol divinyl ether, triethylene glycol divinyl ether, and 1,4-cyclohexanedimethanol divinyl ether.

14. The method of claim 1 wherein the polyfunctional reactive diluent is selected from the group consisting of an ε-caprolactone triol, glycerol, a polyether polyol, a polyester polyol, 1,2,6-hexanetriol, pentaerythritol, and mixtures thereof.

15. The method of claim 1 wherein the polyfunctional reactive diluent comprises a hydroxy-terminated polyester.

16. The method of claim 1 wherein the photoinitiator comprises a sulfonium salt, an iodonium salt, a thermally-blocked acid catalyst, or a mixture thereof.

17. The method of claim 1 wherein the photoinitiator comprises (thiodi-4,1-phenylene) bis-(diphenyl-sulfonium) hexafluoroantimonate, diphenyl-(4-phenylthiophenyl) sulfonium hexafluoroantimonate, triarylsulfonium hexafluoroantimonate salts, mixed triarylsulfonium hexafluorophosphate salts, bis(4-(diphenylsulfonio)phenyl) sulfide bis(hexafluoro-phosphate), diphenyl phenylthiophenyl sulfonium hexafluorophosphate, para-toluenesulfonic acid, dinonylnaphthelene disulfonic acid, dinonylnaphthal-ene monosulfonic acid, dodecylbenzene sulfonic acid, and mixtures thereof.

18. The method of claim 1 wherein the monofunctional reactive diluent comprises an alcohol, a glycol ether, an epoxy compound, or a mixture thereof.

19. The method of claim 18 wherein the epoxy compound comprises an epoxidized C_{10} to C_{30} alpha olefin, 1,2-epoxyhexadecane, 1,2-epoxydecane, 1,2-epoxytetradecane, alpha pinene oxide, limonene monoxide, epoxidized polybutane, a cycloaliphatic monoepoxide, and mixtures thereof.

20. The method of claim 19 wherein the alcohol or glycol ether comprises butanol, n-propanol, hexanol, octanol, diacetone alcohol, ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, ethylene glycol monobutyl ether, propylene glycol monomethyl ether, and mixtures thereof.

21. The method of claim 1 wherein the ultraviolet-curable coating composition further comprises at least one of:

up to about 0.5%, by weight, of a silicone surfactant;

up to about 0.05%, by weight, of an optical brightener; and

up to about 2%, by weight, of a slip- and mar-resistance additive.

22. The method of claim 4 wherein the solvent is selected from the group consisting of acetone, cyclohexanone, methyl ethyl ketone, ethyl aryl ketones, methyl aryl ketones, methyl isoamyl ketone, toluene, benzene, xylene, mineral spirits, kerosene, high flash VM&P naphtha, tetrahydrofuran, a chlorinated solvent, propylene glycol monomethyl ether acetate, and mixtures thereof.

23. The method of claim 4 wherein the solvent comprises water.

24. The method of claim 1 wherein the radiation-curable coating composition applied in step (b) has a viscosity of about 10 to about 35 seconds (#4 Ford Cup).

25. The method of claim 1 wherein the coated metal can end in step (b) is subjected to radiation in an amount of about 50 to about 300 millijoules of per square centimeter of the coated metal can end.

26. The method of claim 1 wherein the photoinitiator comprises a cationic photoinitiator and the radiation is ultraviolet or e-beam radiation.

27. The method of claim 1 wherein the photoinitiator comprises a thermally-blocked acid catalyst and the radiation is infrared radiation.

28. An easily openable can end prepared by the method of claim 1.

29. An easily openable can end having a score line coated with a radiation cured coating.

30. A metal container having an easily openable can end prepared by the method of claim 1.